UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/837,896	04/18/2001	Shivi Fotedar	3981-12	8334

			EXAMINER
7590	10/18/2004		MEW, KEVIN D

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ART UNIT	PAPER NUMBER
2664	

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Detailed Action

Specification

1.   The abstract of the disclosure is objected to because the abstract should not include the

title of the application at the top of the abstract page. Correction is required. See MPEP

§ 608.01(b).

Claim Objections

2.   Claim 13 is objected to because of the following informalities: the claim sentence should

end with a ".". Appropriate correction is required.

Claim 17 is objected to because of the following informalities: the space for the term

"request s" in line 3 should be deleted and the term "relies" should be written as "replies."

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

3.   Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rao (USP

6,789,118).

Regarding claim 1, Rao discloses a network processing device, comprising:

packet processing circuitry (see the circuitry in the multi-service network switch, col. 3, lines 53-54 and Fig. 1) adapted to receive an address request from any one of multiple processors (forwarding module FM; note that each slot on the switch accommodates a single interface FM module or card, see col. 3, lines 56-58) in the network processing device, the packet processing circuitry adapted to output the address request to a network (the IP forwarder in each FM provides the necessary packet forwarding and route processing intelligence and searches the ARP table for the destination address of an IP packet and sends out a MARP request for the destination address, see col. 10, lines 29-31 and col. 11, lines 17-20 and col. 13. lines 36-46) and to receive an address reply to the address request (a MARP response packet is sent back to the originating FM so that the ARP table is updated with the destination address information, see col. 13, lines 43-46); and

Rao does not explicitly show the packet processing circuitry adapted to multicast the address reply to multiple ones of the processors at the same time. However, Rao discloses that cell buses move user traffic between the FMs using the multicast circuitry and the IP cache residing in each of the FMs includes a list of the most recently IP source/destination address pairs, along with the physical port address and header information (see col. 5, lines 21-23 and col. 12, lines 15-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the multicast circuitry of the multi-service network switch with the method of updating and storing a list of the most recently port address in the IP cache such that the multicast circuitry will multicast the physical port address reply to the FMs at the same time. The motivation to do so is to speed up the address updating process of the IP cache

residing in each of these FMs that is interested in receiving the latest address information

because using the multicast technique to forward address information will conserve bandwidth

and reduce traffic by simultaneously delivering a single stream of information to a group of

recipients.

Regarding claim 2, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 1 above. Rao further discloses a network processing device according to claim

1 wherein one or more of the multiple processors provide address resolution management that

matches IP addresses with Media Access Control (MAC) addresses (the IP forwarder of the

forwarding module obtain address information from the ARP table through a management ARP

request and the ARP table resolves the IP addresses to MAC addresses, see col. 2, lines 40-41,

col. 11, lines 17-20, col. 12, lines 31-37, and element 44, Fig. 2).

Regarding claim 3, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 1 above. Rao further discloses a network processing device according to claim

1 wherein the packet processing circuitry is located in a line card (the circuitry in the multi-

service network switch includes a redundant bus architecture for interconnecting the FMs, see

col. 4, lines 64-65 and the bus lines in Fig. 2) and the multiple CPUs are located in one or

more control cards (each FM is a single interface card, see col. 3, lines 56-58).

Regarding claim 4, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 1 above. Rao further discloses a network processing device according to claim

1 wherein the address request comprises an Address Resolution Protocol (ARP) request and the

address reply comprises an Address Resolution Protocol (ARP) reply (see col. 13, lines 33-46).

Regarding claim 5, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 1 above. Rao further discloses a network processing device according to claim

1 including address tables (ARP tables) associated with each of the multiple processors (ARP

tables are associated with forwarding modules FMs, see Fig. 4), the processors in parallel (see

FMs in parallel, Fig. 1) each adding an IP address and associated Media Access Control address

to the associated address tables received in the multicast address reply (IP address and MAC

address are added to the ARP table, see col. 12, lines 31-37 and Fig. 8).

Regarding claim 6, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 1 above. Rao further discloses a network processing device according to claim

1 wherein the packet processing circuitry (the multi-service network switch provides a generic

forwarding interface GFI to enable distributed multicasting by using a port addressing scheme to

forward packets anywhere in the switch, see col. 27, lines 22-32) converts the address reply from

one or more unicast packets to one or more multicast packets and sends the multicast packets to

each of the processors at the same time (GFI allows distributed multicasting by sending a packet

to a multicast group where each of the recipient cards of the multicast group receives the packet,

see col. 29, lines 13-20).

Regarding claim 7, Rao discloses all the aspects of the claimed invention set forth in the rejection of claim 1 above. Rao further discloses a network processing device according to claim 1 including a switch fabric (see generic forwarding interface GFI, Fig. 4) coupled between the packet processing circuitry and the processors, the switch fabric including separate egress ports for separately sending the same address reply to each one of the processors (GFI of the IP forwarder module allows distributed multicasting by sending a packet to a multicast group where each of the recipient cards of the multicast group receives the packet, see col. 29, lines 13-20 and Fig. 4).

Regarding claim 8, Rao discloses a method of updating addresses, comprising:

sending the packet out with the first address to another network device (FM places the MARP requests in front of the IP packet and forwards the IP packet out the appropriate interface such as an Ethernet network device, see col. 13, lines 38-39 and PM 12a, Fig. 1);

receiving an address request from one or more of the applications or processors for a second address associated with the first address (receiving a management ARP request associated with the IP address from the IP forwarder module of the FM for the destination port address associated with the IP address, see col. 13, lines 33-41);

sending the address request over a network (broadcasts the MARP request out on the management bus (see col. 13, lines 39-40);

receiving an address reply from the network identifying the second address associated with the first address (originating FM receiving a MARP response packet so that the FM's ARP table can be updated with the port address information, see col. 13, lines 43-46); and

Rao does not explicitly show the method of broadcasting the address reply to multiple

ones of the applications or processors at the same time. However, Rao discloses that cell buses

move user traffic between the FMs using the multicast circuitry and the IP cache residing in each

of the FMs includes a list of the most recently IP source/destination address pairs, along with the

physical port address and header information (see col. 5, lines 21-23 and col. 12, lines 15-23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to combine the multicast circuitry of the multi-service network switch with

the method of updating and storing a list of the most recently port address in the IP cache such

that the multicast circuitry will broadcast the physical port address reply to the FMs at the same

time. The motivation to do so is to speed up the address updating process of the IP cache

residing in each of these FMs because using the broadcast technique o forward address

information will conserve bandwidth and reduce traffic by simultaneously delivering a single

stream of information to a group of recipients.

Regarding claim 9, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 8 above. Rao further discloses a method according to claim 8 including using

an Address Resolution Protocol (ARP) to send the address request and receive the address reply

(see col. 13, lines 33-46).

Regarding claim 10, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 8 above. Rao further discloses a method according to claim 9 including

broadcasting the ARP reply to the multiple applications or processors by designating the ARP

reply packets as multicast packets.

Regarding claim 11, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 8 above. Rao further discloses a method according to claim 8 including

individually updating address tables associated with each one of the applications or processors

with the second address from the second address from the address reply (see col. 12, lines 16-20

and col. 13, lines 33-46).

Regarding claim 12, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 8 above. Rao further discloses a method according to claim 8 wherein the first

address is an Internet Protocol address and the second address is a Media Access Control (MAC)

address (see col. 12, lines 31-37).

Regarding claim 13, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 8 above. Rao further discloses a method according to claim 8 including

broadcasting the address reply from a line card in a network processing device to the multiple

applications or processors in one or more control cards in the same network processing device

(GFI of the IP forwarder module, see Fig. 4 allows distributed multicasting by sending a packet

to a multicast group where each of the recipient cards of the multicast group receives the packet,

see col. 29, lines 13-20, and col. 27, lines 22-32).

Regarding claim 14, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 8 above. Rao further discloses a method according to claim 8 including

receiving the packet with the first address from an IP network and sending the address request to

endpoints in an Ethernet network (see col. 4, lines 16-22, and elements 10, 12a, Fig. 1).

Regarding claim 15, Rao discloses a network processing device, comprising:

multiple processors for controlling operations in the network processing device

(forwarding modules FMs for providing on-board intelligence, route forwarding, and route

processing information distributed packet routing for the multi-service network switch, see col.

3, lines 53-60); and

Rao does not explicitly show the packet processing circuitry (see Fig. 1) adapted to detect

unicast control packets from a network and convert the unicast control packets into a multicast

control packets that are relayed in parallel to the multiple processors at the same time. However,

Rao discloses that cell buses move user traffic between the FMs using the multicast circuitry and

the IP cache residing in each of the FMs includes a list of the most recently IP source/destination

address pairs, along with the physical port address and header information (see col. 5, lines 21-23

and col. 12, lines 15-23). Rao further discloses the method of allowing distributed multicasting

by sending a packet to a multicast group where each of the recipient cards of the multicast group

receives the packet (see col. 29, lines 13-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to combine the multicast circuitry of the multi-service network switch with

the method of updating and storing a list of the most recently port address in the IP cache such

that the multicast circuitry will multicast the physical port address reply, which is received as a

unicast packet, to the FMs at the same time.   The motivation to do so is to speed up the address

updating process of the IP cache residing in each of these FMs that is interested in receiving the

latest address information because using the multicast technique to forward address information

will conserve bandwidth and reduce traffic by simultaneously delivering a single stream of

information to a group of recipients.

Regarding claim 16, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 15 above. Rao further discloses a network processing device according to

claim 15 wherein the control packets comprise address resolution protocol packets (management

ARP response packet, see col. 13, lines 33-46).

Regarding claim 17, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 16 above. Rao further discloses a network processing device according to

claim 16 including multiple network interfaces (forwarding modules FMs, see element 10, Fig.

1) each coupled to different ports (see Fig. 1) and adapted to detect replies to address resolution

requests (the IP forwarder module of FM invokes an management ARP request to discover the

destination address, see col. 2, lines 52-53, col. 13, lines 33-41, and Fig. 9) and.

Rao does not explicitly show broadcasting the detected replies to the multiple processors.

However, Rao discloses that cell buses move user traffic between the FMs using the multicast

circuitry and the IP cache residing in each of the FMs includes a list of the most recently IP

source/destination address pairs, along with the physical port address and header information

(see col. 5, lines 21-23 and col. 12, lines 15-23). Rao further discloses the method of allowing

distributed multicasting by sending a packet to a multicast group where each of the recipient

cards of the multicast group receives the packet (see col. 29, lines 13-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to combine the multicast circuitry of the multi-service network switch with

the method of updating and storing a list of the most recently port address in the IP cache such

that the multicast circuitry will broadcast the physical port address reply, which is received as a

unicast packet, to each of the FMs at the same time. The motivation to do so is to speed up the

address updating process of the IP cache residing in each of these FMs that is interested in

receiving the latest address information because using the broadcast technique to forward address

information will conserve bandwidth and reduce traffic by simultaneously delivering a single

stream of information to a group of recipients.

Regarding claim 18, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 16 above. Rao further discloses a network processing device according to

claim 16 including address tables (ARP tables) associated with each one of the multiple

processors (ARP tables are associated with forwarding modules FMs, see Fig. 4), the processors

updating the associated address tables with an address contained in the address resolution

protocol packets reply multicast from the packet processing circuitry (IP address and MAC

address are added to the ARP table by the IP forwarder of the FM module, see col. 12, lines 31-

37 and Fig. 8).

including address tables (ARP tables) associated with each of the multiple processors

(ARP tables are associated with forwarding modules FMs, see Fig. 4), the processors in parallel

(see FMs in parallel, Fig. 1) each adding an IP address and associated Media Access Control

address to the associated address tables received in the multicast address reply (IP address and

MAC address are added to the ARP table, see col. 12, lines 31-37 and Fig. 8).

Regarding claim 19, Rao discloses all the aspects of the claimed invention set forth in the

rejection of claim 16 above. Rao further discloses a network processing device according to

claim 15 including a switch fabric (cell buses, see element 20, Fig. 1) having individual egress

ports coupled to each one of the multiple processors (see ports that are coupled to the FMs, see

element 10, Fig. 1). Rao does not explicitly show each one of the egress ports sending control

packets from the packet processing circuitry in parallel to the multiple processors at the same

time.

However, Rao discloses that cell buses move user traffic between the FMs using the

multicast circuitry and the IP cache residing in each of the FMs includes a list of the most

recently IP source/destination address pairs, along with the physical port address and header

information (see col. 5, lines 21-23 and col. 12, lines 15-23). Rao further discloses the method of

allowing distributed multicasting by sending a packet to a multicast group where each of the

recipient cards of the multicast group receives the packet (see col. 29, lines 13-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to combine the multicast circuitry of the multi-service network switch with

the method of updating and storing a list of the most recently port address in the IP cache such

that the multicast circuitry will multicast the physical port address reply, which is received as a

unicast packet, to the FMs at the same time.   The motivation to do so is to speed up the address

updating process of the IP cache residing in each of these FMs that is interested in receiving the

latest address information because using the multicast technique to forward address information

will conserve bandwidth and reduce traffic by simultaneously delivering a single stream of

information to a group of recipients.

Conclusion

4.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure with respect to method and apparatus for updating addresses in network processing

device.

US Patent 6,751,191 to Kanckar et al.

US Patent 5,790,546 to Dobbins et al.

US Patent 6,650,646 to Galway et al.

US Patent 5,818,842 to Burwell et al.

US Patent 6,192,051 to Lipman et al.

US Publication 2002/0107908 to Dharanikota

5.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Kevin Mew whose telephone number is 703-305-5300. The

examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Wellington Chin can be reached on 703-305-4366. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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